PB-242 133

IMPLEMENTATION PLAN REVIEW FOR WISCONSIN AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

Environmental Protection Agency
Research Triangle Park, North Carolina

March 1975

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

163160

EPA-450/3-75-032

March 1975

PB242133

IMPLEMENTATION PLAN REVIEW FOR WISCONSIN AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. Department of Commerce
Springfield, VA. 22151

U. S. ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-450/3-75-032	2.	3. PB 242 133
4. TITLE AND SUBTITLE IMPLEMENTATION PLAN REVIEW FOR WISCONSIN REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT		5. REPORT DATE March 1975 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C., Region V Office, Chicago, Ill., and Argonne National Laboratory, Argonne, Ill.		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. EPA-IAG-05-0463
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air and Waste Management Office of Air Quality Planning and Standards Research Triangle Park, N.C. 27711		13. TYPE OF REPORT AND PERIOD COVERED 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution State Implementation Plans		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited	Unclassified	50
	20. SECURITY CLASS (This page)	22. PRICE
	Unclassified	3.75

EPA Form 2220-1 (9-73)

PRICES SUBJECT TO CHANGE

EPA-450/3-75-032

IMPLEMENTATION PLAN REVIEW

FOR

WISCONSIN

REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

PREPARED BY THE FOLLOWING TASK FORCE:

U. S. Environmental Protection Agency, Region V
230 South Dearborn
Chicago, Illinois 60604

Energy and Environmental Systems Division
Argonne National Laboratory
Argonne, Illinois 60439
(EPA-IAG-D5-0463)

U. S. Environmental Protection Agency
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

March 1975

Preceding page blank

WISCONSIN

ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT
SECTION IV - STATE IMPLEMENTATION PLAN REVIEW

Table of Contents

		Page
1.0	EXECUTIVE SUMMARY	5
2.0	WISCONSIN STATE IMPLEMENTATION PLAN REVIEW	11
	2.1 Summary	11
	2.2 Air Quality Setting for the State of Wisconsin	12
	2.3 Background on the Development of the Current State Implementation Plan	17
	2.4 Special Considerations for the State of Wisconsin	19
3.0	AIR QUALITY CONTROL REGION ASSESSMENTS	20
	3.1 General Methodology	20
	3.2 Metropolitan Dubuque Interstate AQCR (#68)	22
	3.3 Rockford-Janesville-Beloit Interstate AQCR (#73)	22
	3.4 Southeast Minnesota-La Crosse Interstate AQCR (#128)	23
	3.5 Duluth-Superior Interstate AQCR (#129)	23
	3.6 Lake Michigan Intrastate AQCR (#237)	24
	3.7 North Central Wisconsin Intrastate AQCR (#238)	24
	3.8 Southeastern Wisconsin Intrastate AQCR (#239)	25
	3.9 Southern Wisconsin Intrastate AQCR (#240)	26

APPENDICES

APPENDIX A - State Implementation Plan Background
APPENDIX B - Regional Air Quality Assessment
APPENDIX C - Power Plant Assessment
APPENDIX D - Industrial, Commercial, Institutional Point Source Assessment
APPENDIX E - Area Source Assessment
APPENDIX F - Fuels Assessment

REFERENCES

Preceding page blank

STATE IMPLEMENTATION PLAN REVIEW

FOR

THE STATE OF WISCONSIN

1.0 EXECUTIVE SUMMARY

The enclosed report is the U.S. Environmental Protection Agency's (EPA's) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the state on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the states. The states may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require states to change any existing plan.

Congress has intended that this report provide the state with information on excessively restrictive control regulations. The intent of ESECA is that wherever possible SIPs be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regard to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, of encouraging states to either defer compliance with regulations or to revise the SO_2 emission regulations. The states have also been asked to discourage large-scale shifts

from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those states with the largest clean fuels saving potential. Several of these states have or are currently in the process of revising SO_2 regulations. These states are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 states and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are: 1) the use of the example region approach in developing statewide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affects many state plans and in some instances conflicts with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIPs conducted in 1972. At that time SIPs were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a state to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCRs of the state if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the state where sources would not otherwise contribute to NAAQS violations. For example, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned statewide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of states will use the review findings to assist them in deciding whether or not to revise portions of their State Implementation Plans. However, it is most important for those states which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the report's findings are based is that most currently available to the federal government. However, EPA believes that the states possess the best information for developing revised plans. The states have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of quality air. Therefore, those states desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that states select control strategies which place emissions from fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution situations such as sulfates.

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emissions and are a major source of TSP emissions.

Part of each state's review was organized to provide an analysis of the SO_2 and TSP emission tolerances within each of the various AQCRs. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the state's fuel combustion sources (power plants, industrial sources, and area sources) has also been carried out.

The following are the principle findings for the State of Wisconsin. (Air Quality Control Regions are displayed on Fig. 1-1.)

- The state adopted the original federal National Ambient Air Quality Standards for both total suspended particulates and sulfur dioxide. Two of these standards for sulfur dioxide are no longer in effect at the federal level but still exist as state standards. The state, however, is currently considering deleting the two standards. After the deletion, the state standards would be equivalent to the federal standards.

- Wisconsin used a modified example region approach to develop particulate regulations. Southeastern Wisconsin (#239) was used as an example region to demonstrate primary annual standard attainment throughout the state. A dispersion model was used there and also showed that the secondary annual standard would be met. In subregion 1 (Brown, Outagamie, and Winnebago Counties) of the Lake Michigan AQCR (#237), rollback was used to show that under the proposed regulations the secondary annual standard would be attained. In the other six AQCRs, the Rock County portion of the Rockford-Janesville-Beloit AQCR (#73) served as an example region to demonstrate attainment of the secondary annual particulate standard. Only Southeastern Wisconsin (#239) showed the need for sulfur dioxide emissions controls and dispersion modeling was used there to demonstrate the sufficiency of the regulations.

- In all Wisconsin AQCRs there are reported high particulate levels (based on 1973 data except in the Southern Wisconsin AQCR #240 where more recent local data was used) or levels sufficiently close to the standards to indicate only a small margin for an emission increase. There appears to be a sufficient number of monitoring sites to support this conclusion but in Rockford-Janesville-Beloit (#73) some sites did not report an annual average.

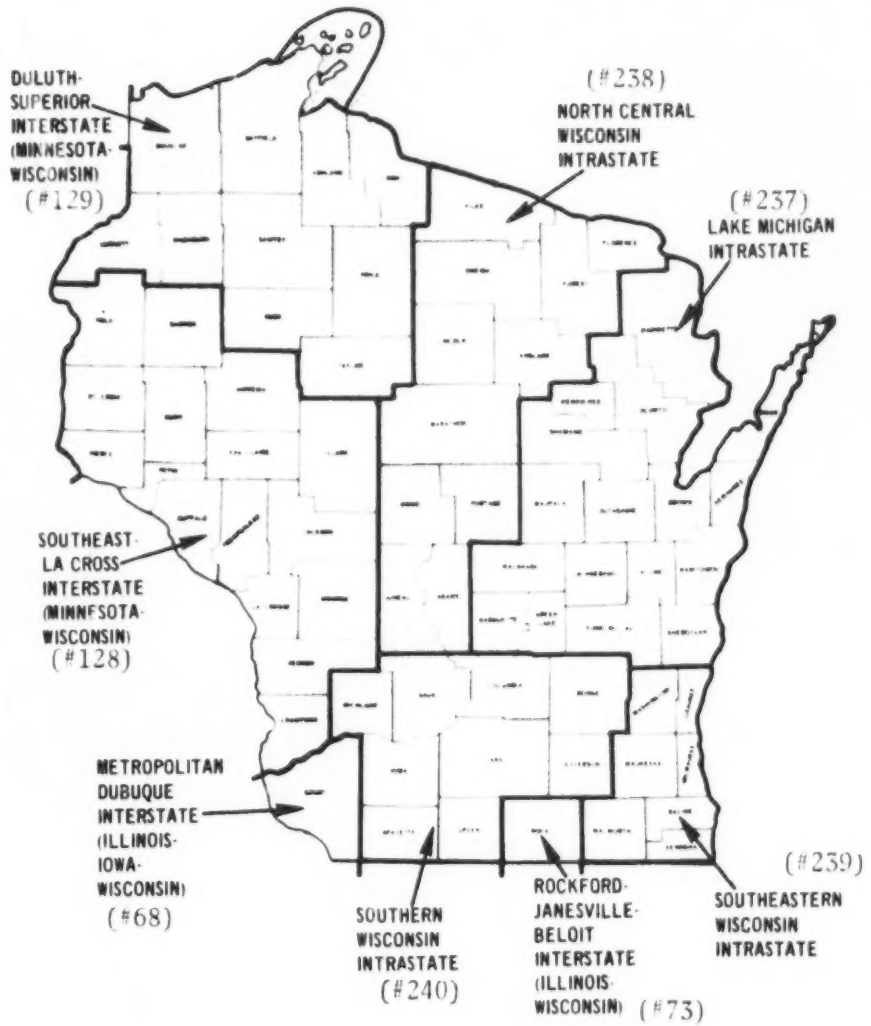

Figure 1-1. Wisconsin Air Quality Control Regions (AQCRs)

- Except in the Southeastern Wisconsin AQCR (#239) where the state regulation prohibits coal burning for small (less than 250 million BTUs per hour) fuel combustion sources, the state particulate regulations would not keep a large source from switching from oil or gas to coal, since the particulate emissions limits can be met with suitable control equipment. In Southeastern Wisconsin (#239), high particulate levels suggest that the existing regulations should not be relaxed.

- There are indications (based on 1973 data) of a significant tolerance for increased sulfur dioxide emissions in all AQCRs in Wisconsin. The number of monitors appears to be sufficient but there are no annual average data from Metropolitan Dubuque (#68) and North Central Wisconsin (#238).

- The state of Wisconsin does not regulate the sulfur content of normal fuels for existing, unmodified fuel combustion sources except when such sources can be shown to contribute substantially to the violation of an air standard. New and/or modified sources with heat inputs greater than 250 million BTUs per hour must meet a limit equivalent to the federal New Source Performance Standards. The sulfur content of standby fuels is regulated but proposed regulation revisions would place this limitation in effect only for the Southeastern Wisconsin AQCR (#239).

- Most of the coal used by Wisconsin power plants and industrial/commercial/institutional point sources is already high (greater than 2 percent) sulfur coal. Only in the Southern Wisconsin AQCR (#240) does a large fraction of the projected coal consumption for these sources contain 1 percent or less sulfur, and there the low sulfur coal is programmed to be used at the large Columbia 1 power plant scheduled to come on line in 1975.

- Given the last two conclusions, there is little reason for Wisconsin to consider revising its sulfur regulations.

- Some fuel burning installations in Wisconsin have already converted from clean fuels to coal and plans for other conversions are underway.

2.0 WISCONSIN STATE IMPLEMENTATION PLAN REVIEW

2.1 Summary

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the state have air quality standards which are more stringent than NAAQS?
- Does the state have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the state use an example region approach for demonstrating the attainment of NAAQS or more stringent state standards?
- Has the state not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on (1973) air quality data, are there indications of a tolerance for increasing emissions?
- Are the total emissions from stationary fuel combustion sources a relatively small portion of the regional total?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?
- Is there a significant clean fuels savings potential in the region?
- Must the regulations be revised to accomplish significant fuels switching?

The following portion of this report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP review report, Section 2 and Appendix A, is organized to provide the background and current situation information for the State Implementation Plan, Section 3, and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for

revising regulations. An evaluation of regional air quality indicators is presented in Appendix B; power plants, industrial sources, and area sources are analyzed in Appendices C, D, and E, respectively.

Based on an overall evaluation of EPA's current information, AQCRs have been classified as good, marginal, or poor candidates for regulation revisions. Table 2-1 summarizes the State Implementation Plan Review. The remaining portions of the report support this summary with explanations.

2.2 Air Quality Setting for the State of Wisconsin

2.2.1 Wisconsin Air Pollution Control Areas

The state of Wisconsin is divided into eight Air Quality Control Regions as shown in Fig. 1-1. There are four intrastate and four interstate regions. Table A-1 gives the pollutant priority classifications for each of these eight regions. This table also shows the population and population density to be largest in the Southeastern Wisconsin AQCR (#239). Based on present conditions and growth projections for the state, some ten counties have been proposed as Air Quality Maintenance Areas (AQMAs) for particulates and seven for sulfur dioxide. These are shown in Table A-1 and Fig. A-1.

2.2.2 Wisconsin Ambient Air Quality Standards

As shown in Table A-2, Wisconsin has adopted all the original federal primary and secondary National Ambient Air Quality Standards for particulates, sulfur dioxide and nitrogen dioxide. Since the adoption of these standards the secondary annual and 24-hour sulfur dioxide standards have been rescinded at the federal level but remain in effect at the state level. The state is, however, currently considering deleting these two standards so that the state and federal standards would be equivalent. In the analysis to follow, however, only attainment of the present federal NAAQS will be considered.

2.2.3 Wisconsin Air Quality Status

The current air quality status in Wisconsin is summarized in Table A-3 for particulates and in Table A-4 for sulfur dioxide. All data came from the SAROAD data bank as of June, 1974.

Table 2-1. State Implementation Plan Review Summary for Wisconsin

"INDICATORS"	State		Metropolitan Dubuque[a] AQCR #68		Rockford-Janesville-Beloit[a] AQCR #73		Southeast Minnesota-LaCrosse[a] AQCR #128		Duluth-Superior[a] AQCR #129	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	No	Yes[l]								
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources	Yes Yes Yes	No No No								
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	Yes	No[b]			Example Region[c]					
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?	Yes	Yes[n]								
• Are there no proposed Air Quality Maintenance Areas?			Yes[f]	Yes	Yes	Yes	Yes	Yes	Yes[g]	Yes
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	Yes[h]	Yes[h]	Yes	Yes	Yes	Yes	Yes
• Is there an expected 1975 attainment date for NAAQS?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?			No	Yes[i]	Yes[i,k]	Yes	No	Yes	No	Yes
• Based on (1973) Air Quality Data, are there indications of a significant tolerance for increasing emissions?			No	Yes	No	Yes	No	Yes	No	Yes
• Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?			No	No	Yes	No	No	No	Yes	Yes
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			N.A.	N.A.	N.A.	N.A.	N.A.	No	N.A.	N.A.
• Is there a significant Clean Fuels Saving potential in the region?			No		No		No		No	
• Must the regulations be revised to accomplish significant fuel switching?			No		No		No		No	
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor	

Table 2-1. State Implementation Plan Review Summary for Wisconsin (Contd.)

"INDICATORS"	Lake Michigan AQCR #237		North Central Wisconsin AQCR #238		Southeastern Wisconsin AQCR #239		Southern Wisconsin AQCR #240	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?								
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources								
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	d				Example Region[e]			
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?								
• Are there no proposed Air Quality Maintenance Areas?	No	Yes	Yes	Yes	No	No	Yes	Yes
• Are there indications of a sufficient number of monitoring sites within a region?	Yes	Yes	Yes	Yes[h]	Yes	Yes[h]	Yes	Yes
• Is there an expected 1975 attainment date for NAAQS?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?	No	Yes	No	Yes[i]	No	Yes[k]	Yes	Yes
• Based on (1973) Air Quality Data, are there indications of a significant tolerance for increasing emissions?	No	Yes	No	Yes	No	Yes[k]	Yes[m]	Yes
• Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?	No	No	No	No	No	No	No	No
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?	N.A.	N.A.	N.A.	N.A.	N.A.	No	N.A.	No
• Is there a significant Clean Fuels Saving potential in the region?	No		No		No		No	
• Must the regulations be revised to accomplish significant fuel switching?	No		No		Yes[j]		No	
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?	TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Poor	

Table 2-1. State Implementation Plan Review Summary for Wisconsin (Contd.)

Footnotes

[a] Interstate.

[b] Only the Southeastern Wisconsin AQCR (#239) required control of sulfur oxides.

[c] Rock County used as example region to demonstrate secondary standard attainment in all AQCR's except in Lake Michigan (#237) and Southeastern Wisconsin (#239).

[d] Rollback used to demonstrate secondary standard attainment.

[e] Example region to demonstrate primary standard attainment in all AQCR's.

[f] There is a proposed AQMA in the Iowa portion of this region.

[g] There is a proposed AQMA in the Minnesota portion of this region.

[h] There are indicators of a sufficient number of monitors but not all are reporting an annual average.

[i] No annual data.

[j] Present regulation allows no coal burning for sources < 250×10^6 BTU/hr in this AQCR.

[k] More recent local air quality data indicate that there are NAAQS violations in this region.

[l] Wisconsin is presently considering adopting SO_2 standards equivalent to the NAAQS.

[m] More recent local air quality data indicate that the tolerance for increased emissions may be small.

[n] Some fuel burning installations have already converted from clean fuels to coal. Plans for other conversions are underway.

Violations of particulate NAAQS are found in all regions except except Southern Wisconsin (#240). In the other seven AQCRs, high particulate levels show little regional ability to absorb increased particulate emissions. This conclusion is strengthened by the proposed particulate AQMAs in the Lake Michigan (#237) and Southeastern Wisconsin (#239) AQCRs, indicating expected problems in maintaining acceptable air quality. There is also a proposed particulate AQMA in the Iowa portion of Metropolitan Dubuque (#68) and another in the Minnesota portion of Duluth-Superior (#129), showing expected maintenance problems in these regions. Thus, with the exception of Southern Wisconsin (#240), there are indications that particulate emission regulation relaxation will not be possible without disrupting NAAQS attainment and maintenance (see Table 2-1).

There are no above standard SO_2 levels recorded in the SAROAD data for the state of Wisconsin. However, annual average data is lacking from Metropolitan Dubuque (#68) and North Central Wisconsin (#238). There are thus indications of a significant tolerance for increasing SO_2 emissions in all Wisconsin's AQCRs. In Southeastern Wisconsin (#239), however, this result must be qualified by the proposed SO_2 AQMAs indicating potential problems in maintaining acceptable SO_2 air quality (see Table 2-1).

2.2.4 Wisconsin Emissions Summary

Emission sources and emission rates are tabulated in Tables A-5 through A-7.

In the eight AQCR area of which Wisconsin is a part, Wisconsin fuel combustion sources account for over half of the total particulate emissions. Except in Rockford-Janesville-Beloit (#73) and Duluth-Superior (#129), they also contribute more than half of the total particulate emissions in each region (see Table A-5). Electricity generation accounts for the largest portion of the particulate emissions from Wisconsin sources in Metropolitan Dubuque (#68) and Southeast Minnesota-La Crosse (#128) (see Table A-6). Area sources contribute the largest fraction in Rockford-Janesville-Beloit (#73), Duluth-Superior (#129), and Southern Wisconsin (#240). In the Lake Michigan (#237) and Southeastern Wisconsin (#239) AQCRs both electricity generation and area sources contribute about the same fraction of the particulate emissions which fraction is substantially greater than that contributed by

industrial/commercial/institutional point sources. Electricity generation, industrial/commercial/institutional point sources, and area sources each account for about the same fraction of particulate emissions in North Central Wisconsin (#238).

Almost three quarters of the total SO_2 emissions come from Wisconsin fuel combustion sources throughout the eight AQCR area. Electricity generation emits the predominant fraction of the SO_2 from Wisconsin sources in all AQCRs except North Central Wisconsin (#238) and Southern Wisconsin (#240) (see Table A-7). In the former, industrial/commercial/institutional point sources are the largest emitters; in the latter, area sources are the largest emitters.

2.3 Background on the Development of the Current State Implementation Plan

2.3.1 General Information

Wisconsin used a modified example region approach to demonstrate attainment of particulate NAAQS. Three control strategies, P-1, P-2, and P-3, in order of increasing stringency, were developed and modeled by an AQDM dispersion model in the Southeastern Wisconsin AQCR (#239). Strategy P-1 was found sufficient to attain the primary annual standard in this region which was then taken as an example region to show that strategy P-1 would insure primary annual standard attainment throughout the state. Application of strategy P-3 was shown to result in meeting the secondary annual particulate NAAQS in Southeastern Wisconsin (#239). Growth projections indicated that the NAAQS would be maintained through 1975. In the Lake Michigan AQCR (#237), rollback was used in the cities of Green Bay and Appleton to demonstrate the sufficiency of strategy P-2 for attaining the annual secondary particulate standard. The regulations contained in this strategy were to be applied in subregion 1 (Brown, Outagamie, and Winnebago Counties) of the region. In the remaining six Wisconsin AQCRs, the Rock County portion of the Rockford-Janesville-Beloit AQCR (#73) was used as an example region to demonstrate attainment of the secondary annual particulate standard. Proportional rollback was used in Rock County to show that the standard would be attained there. Only in Southeastern Wisconsin (#239) were there indications of a necessity for SO_2 emissions controls. In this region, an AQDM dispersion model was used

to show attainment of the secondary annual SO_2 NAAQS. Control of a coke plant and conversion of one large boiler from coal were shown sufficient to attain the primary annual standard. To attain the secondary annual standard which has since been rescinded at the federal but not the state level, conversion of small and medium sized boilers from coal, as required to meet the particulate regulations, was shown to be necessary. The Wisconsin SIP addressed neither the attainment nor the maintenance of the short term TSP and SO_2 NAAQS.

2.3.2 Particulate Control Strategy

The control strategy for particulate emissions from fuel combustion sources consists of enforcement of the applicable sections of the Air Pollution Control Rules of the Wisconsin Department of Natural Resources. Specific rules apply to both visible emissions and mass emissions rates. These regulations are summarized in Table A-9 and Fig. A-2 and were designed to meet both the primary and secondary annual particulate NAAQS. More stringent limits apply in subregion 1 (Brown, Outagamie, and Winnebago Counties) of the Lake Michigan AQCR (#237) and in the Southeastern Wisconsin AQCR (#239) than apply in the remainder of the state. No coal can be used by small (< 250 million BTUs per hour) sources in Southeastern Wisconsin (#239). There is a provision for the imposition of more stringent limitations if air standards are violated.

2.3.3 Sulfur Dioxide Control Strategy

The regulations for SO_2 emissions are summarized in Table A-9. Specific emission limits apply only to new and modified sources. These limits are equivalent to the federal New Source Performance Standards. The sulfur content of standby fuels is regulated but revised rules would place this limitation in effect only in the Southeastern Wisconsin AQCR (#239). Fuel conversions necessary to attain standards in Southeastern Wisconsin (#239) could come about when small and medium sized boilers switched from coal to meet particulate standards. Specific limitations could be imposed on an existing source by demonstrating that it contributed substantially to exceeding an air standard. Wisconsin's SIP showed that these regulations would result in meeting the annual secondary NAAQS, which has since been rescinded at the federal level, throughout the state.

2.4 Special Considerations for the State of Wisconsin

2.4.1 Planned SIP Revisions

Wisconsin is presently not considering changing its State Implementation Plan with respect to fuel combustion sources.

2.4.2 Fuels

No coal is mined in Wisconsin and the state is not a large fuel user compared to large industrialized states. Statewide, about 90% of the heat input for power plants and over three quarters of the heat input for industrial/commercial/institutional point sources come from coal. For area sources, over 25% of the heat input comes from oil of which almost 95% is distillate oil and over two thirds of the heat input comes from natural gas.

2.4.3 Fuel Conversions

The Federal Energy Administration[6] has identified the Weston power plant in North Central Wisconsin (#238) as having the potential to switch from oil burning to coal burning.

Some fuel burning installations in Wisconsin have already converted from clean fuels to coal. Plans for other conversions are underway.

3.0 AIR QUALITY CONTROL REGION ASSESSMENTS

3.1 General Methodology

The previous section having set the background for the State Implementation Plan and evaluated the current air quality situation, this section will review the available information for each AQCR to determine the feasibility of relaxing emission regulations in the interest of conserving clean fuels. Care must be taken in interpreting the results of this analysis and the following caveats must be kept in mind: (1) The analytical procedure is intended to provide a first approximation to the evaluation of potential regulation changes (e.g., rollback and single source modeling techniques were used). The state must conduct a more detailed analysis of the situation to confirm or dispute any of these findings prior to submitting any SIP revisions. (2) In many instances the necessary data were unavailable or limited in scope. Where better information is available, the state should use it in developing SIP revisions.

The analysis encompasses five distinct considerations for each AQCR. First, the current air quality situation is assessed to determine if the indicators point to the region's ability to tolerate an emission increase without violation of any NAAQS. Most of the data necessary for this review have already been presented in Section 2 and Tables B-1 and B-2 summarize the information for particulates and SO_2, respectively, in each AQCR. The assessment is made on the basis of 7 criteria: (1) current air quality violations, (2) expected NAAQS attainment dates, (3) proposed Air Quality Maintenance Area designations, (4) total emissions, (5) portion of emissions from the state's fuel combustion sources, (6) regional emission reduction required (based on rollback calculations), and (7) pollutant priority classification. Note that this evaluation is based strictly on air quality considerations. Determinations of whether regulation relaxation would, in fact, result in clean fuels savings will be made on a source-by-source evaluation.

The second consideration for each AQCR is the power plant assessment and this data is summarized in the tables in Appendix C. All existing and proposed plants are reviewed to determine the clean fuel requirements imposed by the existing regulations. Where dispersion modeling data

are available, the maximum allowable fuel sulfur content which would enable the plant to meet the NAAQS in its immediate vicinity is determined and compared to that required by existing regulations. For the purposes of this report, the SO_2 modeling data used[1] assumes the power plant fuel use pattern in 1975 will be the same as that existing in 1971 with the addition of fuel consumption for new units coming on-line. The choice of 1971 as the baseline year is based on the consideration that fuel switching to achieve SIP emission regulations did not begin nationwide until 1972; therefore 1971 represents consumption patterns which are not dictated by emission regulations but rather by the economics of fuel availability. In terms of the maximum allowable fuel sulfur content determined from the modeling, the 1971 fuel sulfur content is used as an upper bound. No particulate modeling results were available. Fuel data[2,3] and emission data[4,5] are drawn from both published and unpublished sources.

The third consideration for each AQCR is the assessment of large industrial/commercial/institutional point sources and the summary data is presented in Appendix D. The procedure is effectively equivalent to that carried out for power plants in that the sulfur contents of fuels allowed under existing regulations are determined along with total clean fuels requirements. Fuel use data were drawn from the National Emission Data System (NEDS) file.[5] No individual source modeling data were available.

The fourth consideration is area source assessments. The fuel use patterns for these sources are taken from NEDS data.[5] The results are summarized in Appendix E.

The fifth consideration is a synthesis for the first four. Fuel use requirements for power plants and industrial/commercial/institutional point sources are aggregated by region and for the entire state. Estimates of potential clean fuels savings are made where modeling data exists. The summary table is in Appendix F.

At this point, an overall assessment of the potential for regulation revision and resulting clean fuel savings can be made. The findings for each AQCR have been summarized on Table 2-1 and in Section 1. An AQCR is determined to be a good candidate for emission limit regulation revision

if the air quality indicators show that the region has a tolerance to absorb increased emissions and if the source-by-source evaluations show that significant clean fuels savings could be effected by such revision. If the air quality situation is such that no emission increase could be tolerated and/or if the source evaluations show little or no clean fuels savings potential, then the region is classified as a poor candidate for regulation revision. If the air quality or the clean fuels savings evaluations are inconclusive or show conflicting information, then the region is assessed as a marginal candidate for regulation revision. A much more detailed analysis must be carried out by the state to resolve the situation.

3.2 Metropolitan Dubuque Interstate AQCR (#68)

Metropolitan Dubuque (#68) is a poor candidate for particulate regulation relaxation. Based on regional air quality data there are high particulate levels and rollback indicates that a significant reduction in emissions is needed to attain acceptable air quality (see Tables A-3, A-8, and 2-1). Although there are no proposed AQMAs in the Wisconsin portion of the region, one has been proposed in Iowa showing existing or expected air quality problems in the region (see Tables B-1 and 2-1).

This region is also a poor candidate for relaxation of SO_2 emission regulations. Although there are indications of a significant capacity to absorb increased SO_2 emissions, no annual average data is available (see Tables A-4, A-8, and 2-1) and the major point sources in the region are already using high sulfur coal (< 2% S, see Table E-1). Wisconsin does not regulate the sulfur content of the fuels for existing, unmodified sources or small (< 250 million BTUs per hour) new sources. Small area sources are not regulated and fuel use figures for these sources are given in Table E-1.

3.3 Rockford-Janesville-Beloit Interstate AQCR (#73)

Although there are no reported high particulate levels in SAROAD the indications are that a significant ability to absorb increased particulate emissions does not exist (see Tables A-3, A-8, and 2-1). Annual average data is unavailable in SAROAD and recent local data indicate that there are NAAQS violations. Even though the emissions from fuel combustion are

a relatively small fraction of the regional total (see Tables A-5 and 2-1), there is little potential to shift from oil to coal (see Table F-1). The region is thus a poor candidate for particulate emission regulation relaxation.

Although there are indications of acceptable SO_2 air quality and a significant tolerance for increasing emissions (see Table A-4, A-8, and 2-1), this region is a poor candidate for SO_2 emission regulation relaxation. All major point sources already burn high (> 2%) sulfur coal (see Table F-1). No specific sulfur emission limits presently apply to existing unmodified, and small (< 250 million BTUs per hour) new sources. Fuels with any sulfur content may be used as long as air standards are not violated. Small area sources are not regulated and fuel use figures for these sources are given in Table E-1.

3.4 Southeast Minnesota - LaCrosse Interstate AQCR (#128)

Existing high particulate levels and rollback estimates showing that an overall large emission reduction is required to attain the NAAQS make this region a poor candidate for particulate emission regulation relaxation.

The region is also a poor candidate for SO_2 emission regulation relaxation. Modeling results for specific power plants indicate that high (> 3%) sulfur coal (see Table C-1) can continue to be used. Almost all coal presently used is high (> 2%) sulfur content. No specific sulfur emission limits apply to existing and small (< 250 million BTUs per hour) new sources. Fuels with any sulfur contents may be burned providing air standards are not violated.

3.5 Duluth-Superior Interstate AQCR (#129)

There are indications of high particulate levels in this AQCR. Although there are no proposed particulate AQMAs in the Wisconsin portion of the region, there is one in the Minnesota portion, suggesting existing or anticipated problems in maintaining acceptable air quality. Even though Wisconsin fuel combustion sources contribute only a small fraction of the regional particulate emissions, the large percentage reduction needed to meet the ambient standards suggests that regulations should not be relaxed. The region is a poor candidate for particulate emission regulation relaxation.

The Duluth-Superior region shows no high SO_2 levels and a substantial ability to absorb increased SO_2 emissions based on rollback calculations. However, since Wisconsin does not regulate the sulfur contents of fuels for existing and small (< 250 million BTUs per hour) new fuel combustion sources and since most of the coal used by point sources is already of high (> 2%) sulfur content, there is little reason to consider relaxing the regulations. Small area sources are not regulated. Fuel use by area sources is given in Table E-1.

3.6 Lake Michigan Intrastate AQCR (#237)

High particulate levels are reported in this region and rollback calculations suggest that a reduction in regional emissions is necessary to meet the particulate NAAQS. Particulate AQMAs have also been proposed indicating expected problems in maintaining low particulate levels. Since fuel combustion accounts for over 90% of the region's particulate emissions, any relaxation would have a significant impact on air quality. The region is thus a poor candidate for particulate emission regulation relaxation.

This AQCR is a poor candidate for SO_2 emission regulation relaxation. About 85% of the coal used by power plants and industrial/commercial/institutional point sources is already high sulfur coal (> 2% S). Although rollback indicates an ability to absorb increased SO_2 emissions, there are no regulations limiting emissions for existing and small (< 250 million BTUs per hour) new sources unless a source is contributing to an air standard violation. Table E-1 gives fuel use figures for small area sources whose fuel contents are not regulated.

3.7 North Central Wisconsin Intrastate AQCR (#238)

High particulate levels have been recorded in this region and rollback indicates that a substantial reduction in regional particulate emissions is necessary to attain acceptable air quality. Almost three quarters of the region's particulate emissions come from fuel combustion sources which thus have a significant impact on air quality. Therefore, the region is a poor candidate for particulate emission regulation relaxation.

The Federal Energy Administration has identified the Weston power plant as capable of switching from oil to coal firing. Such a switch would have to be thoroughly investigated in view of the indications of high particulate levels.

In this region there appears to be a significant tolerance for increased SO_2 emissions but no annual average data are available. Fuel combustion sources account for over 75% of the region's SO_2 emissions making them an important factor in determining SO_2 air quality. Over 80% of the coal burned by point sources is high (> 2%) sulfur coal and the sulfur content of fuels is not regulated for existing, unmodified sources and small (< 250 million BTUs per hour) new sources. Thus, North Central Wisconsin is a poor candidate for SO_2 emission regulation relaxation. Small area sources are not regulated and fuel use figures for them are given in Table F-1.

3.8 Southeastern Wisconsin Intrastate AQCR (#239)

There are indications of high particulate levels in this region and rollback calculations show no regional tolerance for increased emissions. The proposal of particulate AQMAs reinforces the suggestions of existing or expected particulate air quality problems. Fuel combustion sources should have a significant impact on air quality, as they contribute almost three fourths of the regional particulate emissions. Coal burning is presently prohobited for small (< 250 million BTUs per hour) combustion sources in this region. In view of the poor air quality and large potential impact of increased emissions, this region is a poor candidate for particulate emission regulation relaxation.

Southeastern Wisconsin (#239) is a poor candidate for SO_2 emission regulation relaxation. All the coal presently being burned by power plants and large industrial/commercial/institutional point sources has high (> 2%) sulfur content. Modeling results do indicate, however, that some violations of the primary 24-hour SO_2 NAAQS may occur in the vicinity of some power plants with present coals (see Table C-1). Further analysis of this situation is indicated particularly since the proposal of SO_2 AQMAs suggests expected difficulties maintaining acceptable air quality. Although no high SO_2 levels are reported in SAROAD, more recent local air quality data show violations of NAAQS. Also, the fact that over 90% of the region's SO_2

emissions come from fuel combustion reinforces the expectation of a maintenance problem. The sulfur content of fuels for existing, unmodified and small (< 250 million BTUs per hour) new sources is not presently regulated by the state of Wisconsin. Small area sources cannot burn coal but the sulfur content of their fuels is unregulated. Fuel use figures for these sources are given in Table E-1.

3.9 Southern Wisconsin Intrastate AQCR (#240)

Although there are indications of acceptable air quality and although rollback suggests a tolerance for increased particulate emissions based on data in SAROAD, the insignificant clean fuels saving potential makes this region a poor candidate for particulate emission regulation relaxation. In addition, recent local air quality data indicate that TSP levels are quite close to NAAQS and that the tolerance for increased particulate emissions may be small. Little oil and gas are used in power plants and industrial/commercial/institutional point sources in Southern Wisconsin (#240) (see Tables C-2 and D-2). Hence, little saving of these fuels would be gained by switching to coal. Although area sources are not prohibited from using coal, it is unlikely that many of them possess coal burning capability.

This region is unique among Wisconsin AQCRs in showing a significant use of low sulfur coal (< 1% S) by 1975. This coal is programmed for use in the new Columbia 1 power plant. This plant falls into the group of large, new plants for which Wisconsin has SO_2 emission limits. Air quality is acceptable and rollback indicates a significant regional tolerance for increased emissions. Modeling results for the Columbia plant suggest that the programmed coal should not cause air quality problems. However, since the plant will probably have to meet federal New Source Performance Standards, there is little to be gained by changing the emissions regulations. For existing, unmodified and small (< 250 million BTUs per hour) new sources, Wisconsin does not limit SO_2 emissions and they are already using mostly high (> 2%) sulfur coal. The region is thus a poor candidate for SO_2 emission regulation relaxation. Area sources are not regulated as to SO_2 emissions and area source fuel use figures are given in Table E-1.

State Implementation Plan Background

Table A-1. Wisconsin Air Pollution Control Areas

Air Quality Control Region	Federal Number	Demographic Information: Population 1970 (Millions)	Area (Square Miles)	Population Per Square Mile	Priority Classification: Particulates	SO_x	NO_x	Proposed AQMA Designations[a]:	TSP Counties		SO_x Counties
Metropolitan Dubuque (Ill., Ia.)	68	202.7	3,788	54	I	III	III	(0)		(0)	
Rockford-Janesville-Beloit (Ill.)	73	568.8	3,485	163	II	III	III	(0)		(0)	
Southeast Minnesota-La Crosse (Minn.)	128	1,113.6	24,073	46	II	IA	III	(0)		(0)	
Duluth-Superior (Minn.)	129	486.5	28,557	17	I	II	III	(0)		(0)	
Lake Michigan	237	915.8	10,415	88	II	III	III	(3)	Brown, Outagamie, Winnebago	(0)	
North Central Wisconsin	238	328.3	9,840	33	II	III	III	(0)		(0)	
Southeastern Wisconsin	239	1,762.1	2,622	672	I	II	III	(7)	Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, Waukesha	(7)	Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, Waukesha
Southern Wisconsin	240	581.1	6,841	85	II	III	III	(0)		(0)	

[a]As of January, 1975.

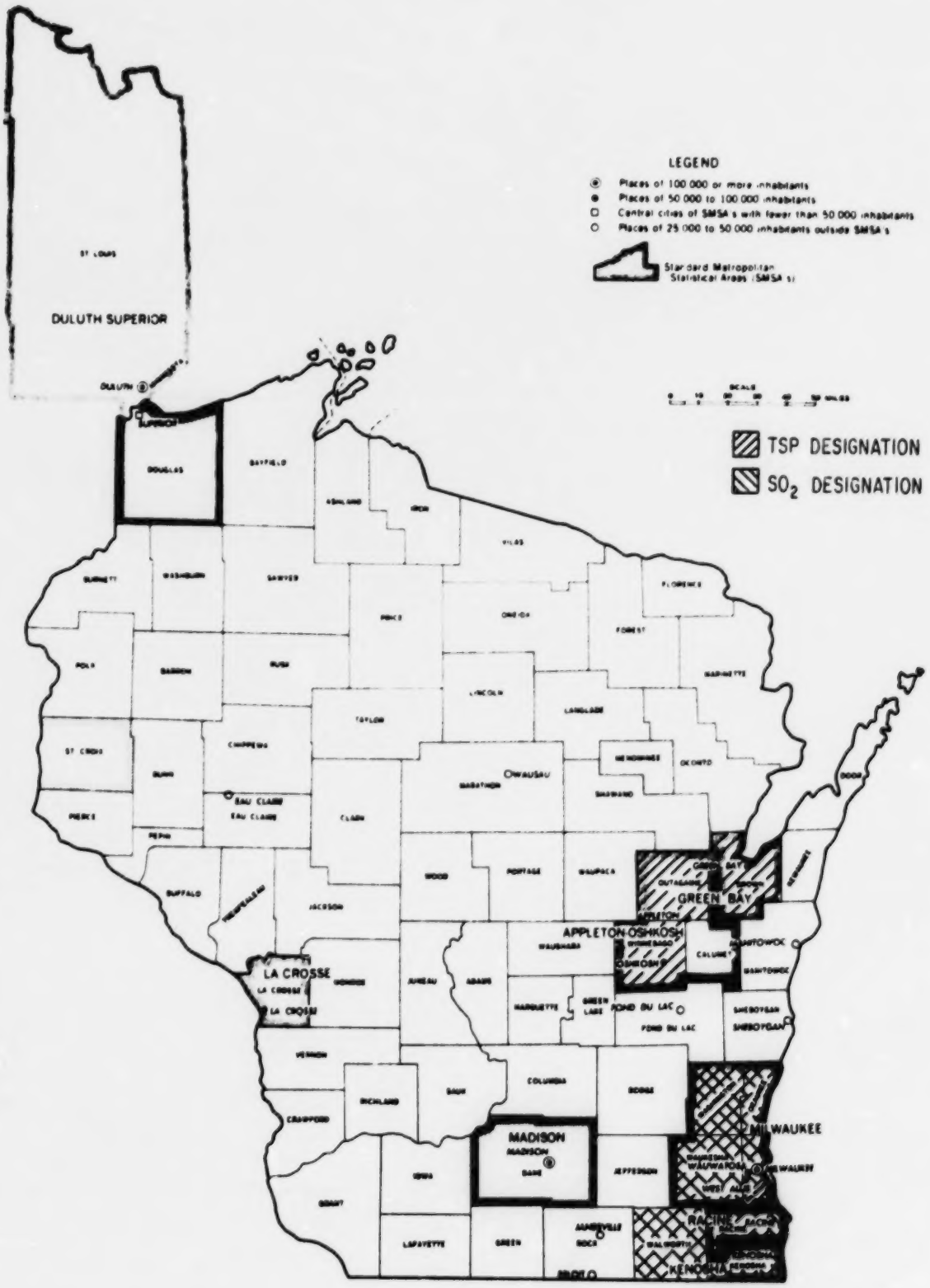

Figure A-1. Proposed Wisconsin Air Quality Maintenance Areas (AQMAs)

Table A-2. Wisconsin Ambient Air Quality Standards

All concentrations in $\mu gm/m^3$

		Total Suspended Particulate		Sulfur Dioxide			Nitrogen Dioxide
		Annual	24-Hr	Annual	24-Hr	3-Hr	Annual
Federal	Primary	75(G)	260[a]	80(A)	365[a]	---	100(A)
	Secondary	60(G)	150[a]	---	---	1300[a]	100(A)
State	Primary	75(G)	260[a]	80(A)	365[a]	---	100(A)
	Secondary	60(G)	150[a]	60(A)	260[a]	1300[a]	100(A)

[a]Not to be exceeded more than once per year.

(A) Arithmetic mean

(G) Geometric mean

Table A-3. Wisconsin AQCR Air Quality Status, TSP[a]

AQCR No.	No. Stations Reporting		TSP Concentration ($\mu gm/m^3$)			Number of Stations Exceeding Ambient Air Quality Standards				% Reduction Required to Meet Standards[d]	Controlling Standard
			Highest Reading		2nd Highest Reading	Primary		Secondary			
	24-Hr	Annual	Annual	24-Hr	24-Hr	Annual	24-Hr[c]	Annual	24-Hr[c]		
68[b]	6	1	31	215	206	0	0	0	2	+ 33	24-Hr
73[b]	4	0	-	190	141	-	0	-	0[e]	- [e]	24-Hr[e]
128[b]	17	11	77	342	228	1	0	3	6	+ 42	Annual
129[b]	32	16	81	522	283	3	1	7	15	+ 54	24-Hr
237	17	11	64	192	159	0	0	1	3	+ 14	Annual
238	6	3	28	656	633	0	1	0	1	+ 81	24-Hr
239	30	19	81	359	297	1	1	4	7	+ 56	24-Hr
240	9	7	47	138	129	0	0	0	0[f]	- 23[f]	24-Hr

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974.

[b] Interstate

[c] Violations based on 2nd highest reading any any station.

[d] Formula:

$$\text{Maximum of} \left[\left(\frac{\text{2nd Highest 24-Hr - 24-Hr Secondary Standard}}{\text{2nd Highest 24-Hr - Background}} \right) \times 100, \left(\frac{\text{Annual - Annual Secondary Standard}}{\text{Annual - Background}} \right) \times 100 \right]$$

Wisconsin particulate background concentration: 36 $\mu gm/m^3$

[e] More recent local air quality data indicate that there are TSP NAAQS violations in this region.

[f] More recent local air quality data indicate that TSP levels may be close to NAAQS.

Table A-4. Wisconsin AQCR Air Quality Status, SO_2[a]

AQCR No.	No. Stations Reporting			SO_2 Concentration (ug/m^3)			Number of Stations Exceeding Ambient Air Quality Standards			%Reduction Required to Meet Standards[d]	Controlling Standard
				Highest Reading		2nd-Highest Reading	Primary		Secondary		
	Annual	24-Hr	Cont.	Annual	24-Hr	24-Hr	Annual	24-Hr[c]	24-Hr[c]		
68[b]	0	3	0	—	40	27	—	0	—	-1,252	24-Hr
73[b]	1	2	1	14	140	79	0	0	0	- 362	24-Hr
128[b]	4	7	1	32	610	151	0	-	0	- 142	24-Hr
129[b]	1	8	1	22	107	49	0	0	0	- 264	Annual
237	3	9	0	26	274	269	0	0	—	- 36	24-Hr
238	0	2	0	—	47	45	—	0	—	- 711	24-Hr
239	2	5	5	53	272	53	0	0[e]	0	- 51[e]	Annual[e]
240	6	7	0	41	432	204	0	0	—	- 79	24-Hr

[a] 1973 air quality data in National Aerometric Data Bank as of June 7, 1974.

[b] Interstate.

[c] Violations based on 2nd highest reading at any station.

[d] Formula:

$$\text{Maximum of } \left[\left(\frac{\text{2nd Highest 24-Hr - 24-Hr Standard}}{\text{2nd Highest 24-Hr}}\right) \times 100 \;,\; \left(\frac{\text{Annual - Annual Standard}}{\text{Annual}}\right) \times 100\right]$$

[e] More recent local air quality data indicate a possible NAAQS violation in this region.

Table A-5. Wisconsin Fuel Combustion Source Summary

AQCR No.	Power Plants[a]	Other Fuel Combustion Point Sources[b]	Area Sources[c]	Total Emissions[d] (10^3 tons/year) TSP	Total Emissions[d] (10^3 tons/year) SO_2	% Emissions from Wisconsin Fuel Combustion Sources TSP	% Emissions from Wisconsin Fuel Combustion Sources SO_2
68[e]	2	0	1	22	58	45	78
73[e]	2	2	1	33	69	30	45
128[e]	4	3	16	129	157	55	69
129[e]	2	4	10	110	137	6	10
237	4	9	17	117	195	91	98
238	2	9	11	60	77	73	78
239	7	0	7	140	279	70	91
240	3	3	9	27	31	78	97
Total	26	30	72	638	1,003	58	73

[a]Wisconsin plants.

[b]Wisconsin plants contributing 90% of the particulate and SO_2 emissions or 1,000 or more tons per year.

[c]Wisconsin counties

[d]AQCR total

[e]Interstate.

Table A-6. Wisconsin Emissions Summary[a], TSP

AQCR	Total (10^3 tons/yr)	%	Electricity Generation (10^3 tons/yr)	%	Industrial/Commercial/ Institutional Point Source (10^3 tons/yr)	%	Area Source (10^3 tons/yr)	%
68 Wisconsin	10	2	9	90	0	0	1	7
Other	12	2	2	21	1	10	1	5
Total	22	4	11	52	1	5	2	6
73 Wisconsin	12	2	2	17	1	6	7	64
Other	21	3	5	22	< 1	2	9	43
Total	33	5	7	20	1	3	16	51
128 Wisconsin	77	12	47	61	9	11	15	19
Other	52	8	2	4	1	2	31	60
Total	129	20	49	38	10	7	46	36
129 Wisconsin	11	2	2	19	1	14	4	39
Other	99	16	18	18	19	19	7	7
Total	110	18	20	18	20	18	11	10
237	117	18	38	32	24	20	45	38
238	59	9	16	26	15	25	13	22
239	140	22	52	37	4	3	42	30
240	27	4	1	6	1	5	19	68
Total	638	100	194	30	76	12	194	30

[a]Emissions in National Emissions Data System data bank as of June 1974.

Table A-7. Wisconsin Emissions Summary[a], SO_2

AQCR		Total (10^3 tons/yr)	%	Electricity Generation (10^3 tons/yr)	%	Industrial/Commercial/ Institutional Point Source (10^3 tons/yr)	%	Area Source (10^3 tons/yr)	%
68	Wisconsin	45	4	44	97	0	0	1	2
	Other	13	1	7	56	3	22	2	14
	Total	58	5	51	88	3	5	3	5
73	Wisconsin	32	3	22	70	3	11	6	18
	Other	37	4	19	51	2	5	15	40
	Total	69	7	41	60	5	8	21	30
125	Wisconsin	110	11	86	78	8	7	15	14
	Other	47	5	14	30	3	7	28	59
	Total	157	16	100	64	11	7	43	27
129	Wisconsin	17	2	8	49	1	9	5	27
	Other	120	12	29	24	65	54	15	13
	Total	137	14	37	27	66	48	20	15
237		195	19	114	59	42	22	36	19
238		77	8	16	21	33	43	11	15
239		279	28	211	75	5	2	37	13
240		31	3	9	28	4	12	17	55
Total		1,003	100	579	58	169	17	188	19

[a]Emissions in National Emission Data System data bank as of June 1974.

Table A-8. Wisconsin Required Emissions Reduction[a]

AQCR	Estimated Particulate Emission Reduction Required		Estimated SO_2 Emission Reduction Required	
	%	10^3 tons/year	%	10^3 tons/year
68[b]	+ 33	+ 7	- 1,252[c]	- 726
75[b]	- 9	- 3	- 362[c]	- 250
128[b]	+ 42	+ 54	- 142	- 223
129[b]	+ 54	+ 59	- 264	- 362
237	+ 14	+ 16	- 36	- 70
238	+ 81	+ 49	- 711[c]	- 547
239	+ 56	+ 78	- 51	- 142
240	- 23	- 6	- 79	- 24

[a]Based on a proportional change of emissions to air quality.

[b]Interstate.

[c]Exceptionally large negative numbers indicate current air quality is very good. In this range, the proportional calculations do not give a good picture of allowable emission increases. They are included here only as general indicators.

Table A-9. Wisconsin Fuel Combustion Emission Regulations[a]

	Source Category[b]	Normal Fuel			Standby Fuel[c]
Visible	I, III, IV	≤ Ringelmann #1 or 20% opacity except: a. When equipment is being cleaned or a new fire started and then not to exceed Ringelmann #4 or 80% opacity for 5 min in any hour. Limited to 3 times per day. b. For equipment failures reported to the regulating authority. c. When uncombined water vapor is the only reason for non-compliance. d. When permitted by the regulating authority e. When a stack test shows the applicable mass emission limits are being met. In this case, a visible limit 0.5 Ringelmann numbers or 10% opacity above the average opacity reading during the test will apply.			Same as Category II, normal fuel.
	II	≤ Ringelmann #2 or 40% opacity with same exceptions as for Categories I, III, and IV.			
Particulate Matter	I		≤ 250 x 10^6 BTU/hr	> 250 x 10^6 BTU/hr	Emissions cannot substantially contribute to the exceeding of an standard or create air pollution.
		Outside AQCR #239[d]	Maximum of 0.15 lb/10^6 BTU to any stack	0.10 lb/10^6 BTU to any stack	
		Within AQCR #239[d]	No coal and maximum of 0.10 lb/10^6 BTU to any stack	0.10 lb/10^6 BTU to any stack	
	II	See Figure A-2 with a maximum limitation of 0.60 lb/10^6 BTU to any stack irrespective of height.			
	III	See Figure A-2 with a maximum limitation of 0.30 lbs/10^6 BTU to any stack irrespective of height			
	IV		≤ 250 x 10^6 BTU/hr	> 250 x 10^6 BTU/hr	
			No coal and maximum of 0.15 lb/10^6 BTU	Maximum of 0.15 lb/10^6 BTU	
SO_2	Existing	No person shall cause, suffer, allow, or permit emission of sulfur or sulfur compounds into the ambient air which substantially contribute to the exceeding of an air standard or cause air pollution.			Fuel / Maximum % S Coal 1.50 Residual oil 1.00 Distillate oil 0.70
	New or Modified		≤ 250 x 10^6 BTU/hr	> 250 x 10^6 BTU/hr[e]	
		liquid fuel	As for existing sources.	0.80 lb SO_2/10^6 BTU	
		solid fuel	As for existing sources.	1.2 lb SO_2 /10^6 BTU	

[a] Stricter limits can apply where a source can be shown to contribute substantially to exceeding an air standard in a localized area.

[b] I. New or modified sources throughout the state which were constructed or modified after April 1, 1972.
II. All existing sources throughout the state.
III. Existing sources in subregion 1 of the Lake Michigan Intrastate AQCR #237: Brown, Outagamie, and Winnebago counties.
IV. Existing sources in the Southeast Wisconsin Intrastate AQCR #239.

[c] Fuel normally used less than 15 days per year.

[d] Southeast Wisconsin AQCR #239.

[e] These are equivalent to the federal New Source Performance Standards. Based on total heat input from all fuels. For dual firing, allowable emissions are average using these emission factors weighted by percentage of heat input from appropriate fuel category.

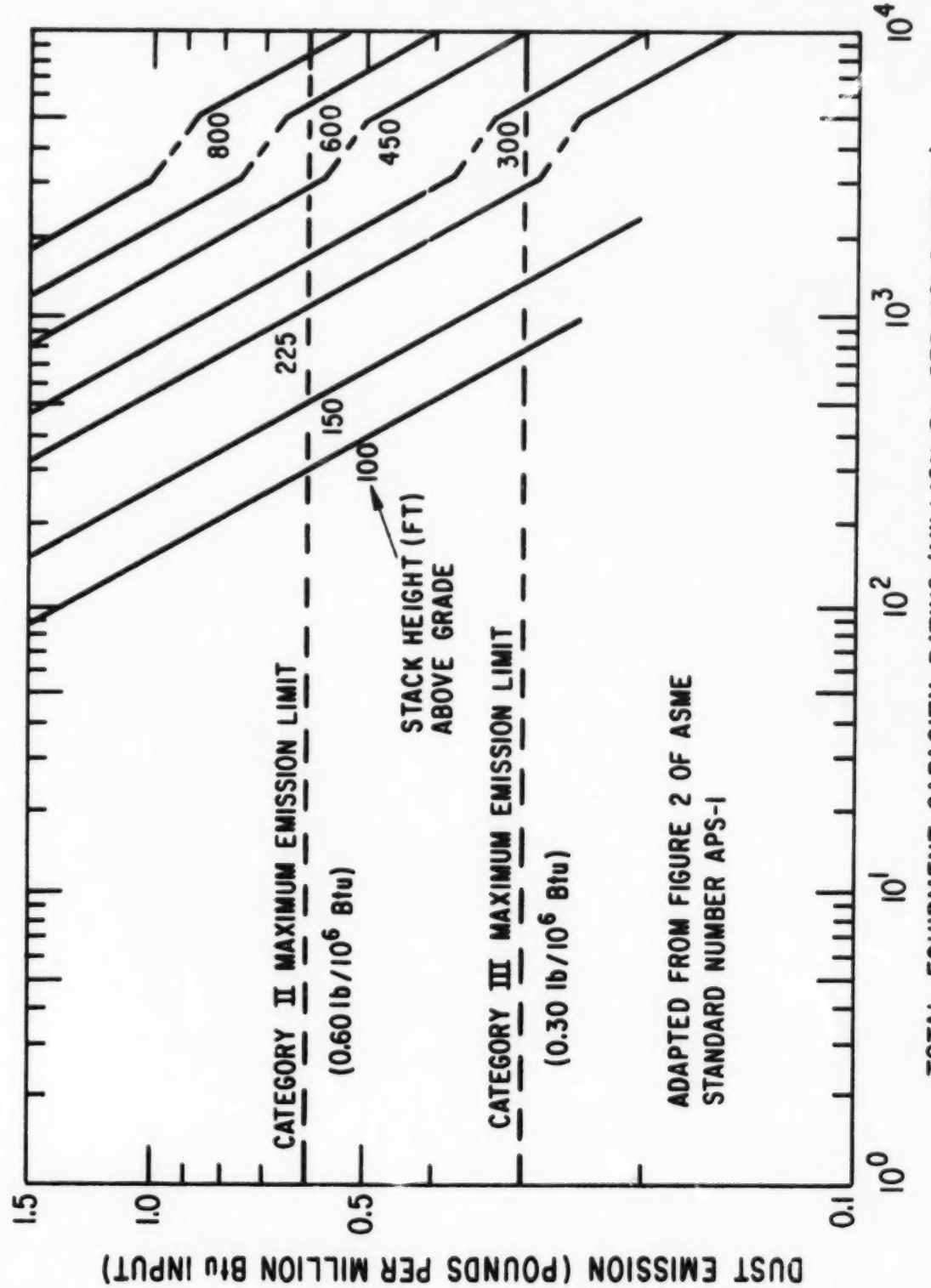

Figure A-2. Allowable Particulate Emissions from Category II and Category III Fuel Combustion Sources in Wisconsin.

Table B-1. Wisconsin AQCR Candidacy Assessment for Particulate Regulation Relaxation

AQCR	Federal Number	Stations with Particulate Air Quality Violations[a]	Expected Attainment Date	Number of Counties with Proposed Particulate AQMA Designations	Total Particulate Emissions (10^3 tons/yr)	% Emissions from Wisconsin Fuel Combustion	Emission Reduction Required for NAAQS (10^3 tons/yr)	Particulate Priority
Metropolitan Dubuque[b]	68	2	7/75	0	22	45	+ 7	I
Rockford-Janesville-Beloit[b]	73	0[c,e]	d	0	33	30	- 3	II
Southeast Minnesota-La Crosse[b]	128	6	7/75	0	129	55	+ 54	II
Duluth-Superior[b]	129	16	7/75	0	110	6	+ 59	I
Lake Michigan	237	4	7/75	3	117	91	+ 16	II
North Central Wisconsin	238	1	7/75	0	60	73	+ 49	II
Southeastern Wisconsin	239	8	7/75	7	140	70	+ 78	I
Southern Wisconsin	240	0	d	0	27	78	- 6	II

[a]Total number of stations given on Table A-3.

[b]Interstate.

[c]No annual data.

[d]Presently meeting standards.

[e]More recent local air quality data indicates that there are particulate NAAQS violations in this region.

Table B-2. Wisconsin AQCR Candidacy Assessment for SO_2 Regulation Relaxation

AQCR	Federal Number	Stations with SO_2 Air Quality Violations[a]	Expected Attainment Date	Number of Counties with Proposed SO_2 AQMA Designations	Total SO_2 Emissions (10^3 tons/yr)	% Emissions from Wisconsin Fuel Combustion	Emission Reduction Required for NAAQS (10^3 tons/yr)	SO_2 Priority
Metropolitan Dubuque[b]	68	0[c]	d	0	58	78	-726	III
Rockford-Janesville-Beloit[b]	73	0	d	0	69	45	-250	III
Southeast Minnesota-LaCrosse[b]	128	0	d	0	157	69	-223	IA
Duluth-Superior[b]	129	0	d	0	137	10	-362	II
Lake Michigan	237	0	d	0	195	98	- 70	III
North Central Wisconsin	238	0[c]	d	0	77	78	-547	III
Southeastern Wisconsin	239	0[e]	d	7	279	91	-142	II
Southern Wisconsin	240	0	d	0	31	97	- 24	III

[a]Total number of stations given in Table A-4.

[b]Interstate.

[c]No annual data.

[d]Presently meeting standards.

[e]More recent local air quality data indicate a possible SO_2 NAAQS violation in this region.

Table C-1. Wisconsin Power Plant Assessment

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
68[d]	Nelson Dewey	227	Coal	565	3.3	-
			Oil	13	0.33	-
	Stoneman	52	Coal	124	3.3	-
			Oil	104	0.30	-
73[d]	Blackhawk	50	Coal	7	3.1	-
			Gas	2,523	-	-
	Rock River	150	Coal	378	3.0	-
			Oil	34	0.33	-
128[d]	Edison	6.5	Coal	2	3.5	-
	French Island	25	Coal	33	3.1	3.1
	Alma	188	Coal	562	3.1	3.1
			Oil	288	0.30	-
	Genoa #3	346	Coal	723	3.7	3.7
			Oil	1,073	0.30	-
129[d]	Bay Front	80	Coal	383	2.7	-
			Oil	588	0.31	-
			Gas	1,486	-	-
	Winslow	25	Coal	3	2.7	-
			Oil	6,090	0.31	-
			Gas	51	-	-

Table C-1. Wisconsin Power Plant Assessment (Contd.)

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
237	Edgewater	477	Coal	1,221	2.4	-
			Oil	168	0.33	-
	Pulliam	392	Coal	1,003	2.6	-
			Oil	593	0.30	-
			Gas	1	-	-
	Manitowoc[e]	69	Coal	134	2.5	-
	Menasha	29	Coal	62	2.5	-
238	Weston	135	Coal	209	3.3	-
			Oil	120	0.30	-
			Gas	2,969	-	-
	Wildwood	42	Coal	89	3.3	-
239	Commerce St.	35	Oil	1,126	0.45	-
			Gas	2,202	-	-
	East Wells St.	15	Coal	5	2.4	-
			Oil	42	0.31	-
	Lakeside	310	Oil	21,461	0.34	-
			Gas	6,268	-	-
	North Oak Creek	500	Coal	830	2.1	2.1[f]
			Oil	461	0.30	-
	Port Washington	400	Coal	682	3.0	3.0
	South Oak Creek	1,192	Coal	2,305	2.1	2.1[f]
			Oil	2,908	0.30	-

Table C-1. Wisconsin Power Plant Assessment (Contd.)

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
239 (Contd.)	Valley	239	Coal	669	3.1	3.1
			Gas	168	-	-
240	Blount St.	196	Coal	149	3.1	-
			Oil	1,037	0.28	-
			Gas	8,305	-	-
	Richland Center	14	Coal	22	3.1	-
	Columbia 1[g]	527	Coal	1,523	0.7	0.6[h]

[a]Coal quantity in 10^3 tons/yr; oil quantity in 10^3 gal/yr; gas quantity in 10^6 ft^3/yr. Estimates based on 1971 fuel use patterns plus planned additions. If 1971 fuel use data were unavailable, 1972 data were used.

[b]Wisconsin regulations do not specify a %S limitation for existing, unmodified plants. The 1971 %S was reported as SIP. If %S figures were unavailable the average for the Wisconsin portion of AQCR was used. If the AQCR-wide average was unavailable the state-wide average was used.

[c]State of Wisconsin regulations do not specify a coal percent sulfur limitation for existing plants; therefore, 1971 coal sulfur content was used and reported.

[d]Interstate.

[e]Includes some fuel usage for uses other than electricity generation.

[f]Modeling calculations indicate that the 24-hour primary air quality standard may be exceeded even at SIP.

[g]New plant in 1975.

[h]Programmed coal %S is less than SIP requirements; therefore, programmed coal %S used.

Table C-2. Wisconsin Power Plant Evaluation Summary

AQCR	Fuel	1975 Fuel Required by SIP Regulations[a] < 1%	1-2%	> 2%	1975 Fuel Required by Modified Regulations[b] < 1%	1-2%	> 2%
68[c]	Coal Oil	117		689	No modeling results available.		
73[c]	Coal Oil Gas	34 2,523		385	No modeling results available.		
128[c]	Coal Oil	1,361		1,320			1,318[d]
129[c]	Coal Oil Gas	6,678 1,537		386	No modeling results available.		
237	Coal Oil Gas	761 1		2,420	No modeling results available.		
238	Coal Oil Gas	120 2,969		298	No modeling results available.		
239	Coal Oil Gas	25,998 8,638		4,491			4,486[e]

Table C-2. Wisconsin Power Plant Evaluation Summary (Contd.)

AQCR	Fuel	1975 Fuel Required by SIP Regulations[a]			1975 Fuel Required by Modified Regulations[b]		
		< 1%	1-2%	> 2%	< 1%	1-2%	> 2%
240	Coal	1,523		171	1,523[f]		
	Oil	1,037					
	Gas	8,305					
Wisconsin Total	Coal	1,523		10,160	1,523		5,804
	Oil	36,106					
	Gas	23,973					

[a]Coal quantity in 10^3 tons/yr; oil quantity in 10^3 gal/yr; gas quantity in 10^6 ft^3/yr. Estimates based on 1971 fuel use patterns plus planned additions. If 1971 fuel use data were unavailable, 1972 data were used. Wisconsin regulations do not specify a %S limitation for existing, unmodified plants. The 1971 %S was reported as SIP.

[b]State of Wisconsin regulations do not specify a coal percent sulfur limitation for existing plants; therefore, 1971 coal sulfur content was used and reported.

[c]Interstate.

[d]No modeling results available for small Edison plant with less than 2% of 1975 generating capacity in AQCR.

[e]No modeling results available for two small plants with 13% of the AQCR's 1975 generating capacity. Modeling calculations indicate that the 24-hour primary air quality standard may be exceeded even at SIP.

[f]At new (1975) Columbia 1 plant, programmed coal %S is less than SIP requirements; therefore, programmed coal %S was used.

APPENDIX D

Industrial, Commercial, Institutional Point Source Assessment

Table D-1. Wisconsin Industrial/Commerical/Institutional Source Assessment

AQCR	Plant[a]	Fuel	Estimated Fuel Consumption[b]	SIP Regulations % SC
68[d]	No plants			
73[d]	Colt Industries	Coal	29	2.8
		Oil	20	0.2
		Gas	30	-
	GM Assembly Division	Coal	43	2.3
		Gas	663	-
128[d]	St. Regis Paper	Coal	16	2.1
		Oil	429	2.8
		Gas	413	-
	Foremost Foods Co.	Coal	13	2.0
		Oil	72	0.4
		Gas	173	-
	Uniroyal Inc.	Coal	47	2.5
		Oil	945	2.6
		Gas	218	-
129[d]	Universal Oil Products	Coal	3	2.0
	American Can Co.	Coal	6	0.7
		Oil	113	1.6
		Gas	152	-
	Twin Ports Coop Dairy	Coal	1	2.5
		Gas	144	-
	Peavey Paper Mills	Coal	12	2.3
237	Nicolet Paper Co.	Coal	35	0.8
	Fort Howard Paper Co.	Coal	231	0.8
	Charmin Fox River Mill	Coal	46	2.9[e]
		Oil	4,117	0.3[e]
		Gas	1,090	-
	Foremost Foods	Coal	7	2.8
	Niagra-Wisconsin Paper Co.	Coal	105	2.6
	Kimberly-Clark	Coal	116	0.9
		Oil	565	2.0
		Gas	1,510	-
	Thilmany Pulp and Paper Co.	Coal	123	3.2
		Oil	296	2.0
		Gas	1,873	-
	Kohler Co.	Coal	50	0.8
	John Strange Paperboard	Coal	55	2.9

Table D-1. Wisconsin Industrial/Commercial/Institutional Source Assessment (Contd.)

AQCR	Plant[a]	Fuel	Estimated Fuel Consumption[b]	SIP Regulations % S[c]
238	Owens-Illinois Forest Products Division	Coal	92	2.8
		Oil	1,495	1.2
		Gas	873	-
	Ward Paper Co.	Coal	11	2.3
	American Can Co.	Coal	167	2.7
		Oil	3,050	3.0
	Mosine Paper Corp.	Coal	62	2.1
		Oil	167	3.5
		Gas	390	-
	St. Regis	Coal	55	0.7
	Consolidated Papers-Biron Division	Coal	139	3.8
	Consolidated Papers	Coal	153	1.0
	Nekoosa Edwards[f]	Coal	9	2.9
		Gas	1,680	-
	Nekoosa Edwards[f]	Coal	87	2.9
		Gas	32	-
239	No plants			
240	Capitol Heat and Power Plant	Coal	10	1.9
	Oscar Mayer and Co.	Coal	35	2.9
		Oil	240	1.0
		Gas	530	-
	Mendota State Hospital	Coal	17	1.9

[a]Wisconsin plants contributing 90% of the AQCR's SO_2 or particulates or emitting more than 1,000 tons/yr.

[b]Coal in 10^3 tons/yr; oil in 10^3 gal/yr; gas in 10^6 ft^3/yr.

[c]Wisconsin regulations do not specify a percent sulfur in fuel limit for existing, unmodified sources. The sulfur contents reported here are those presently being used.

[d]Interstate

[e]Average value for all oil consumed.

[f]One of two Nekoosa Edwards plants in the AQCR.

Table D-2. Wisconsin Industrial/Commercial/Institutional Source Evaluation Summary

AQCR	Fuel	Fuel Required by Existing Regulations[a] < 1%	1-2%	> 2%
68[b]	No plants			
73[b]	Coal			72
	Oil	20		
	Gas	693		
128[b]	Coal		13	63
	Oil	72		1,374
	Gas	804		
129[b]	Coal	6	3	13
	Oil		113	
	Gas	296		
237	Coal	432		336
	Oil	4,117	861	
	Gas	4,473		
238	Coal	55	153	567
	Oil		1,495	3,217
	Gas	2,975		
239	No plants			
240	Coal		27	35
	Oil		240	
	Gas	530		
Wisconsin Total	Coal	493	196	1,086
	Oil	4,209	2,709	4,591
	Gas	9,771		

[a]Coal in 10^3 tons/yr; oil in 10^3 gal/yr; gas in 10^6 ft^3/yr. Wisconsin regulations do not specify a percent sulfur in fuel limit for existing, unmodified sources. The sulfur contents reported here are those presently being used.

[b]Interstate

APPENDIX E

Area Source Assessment

Table E-1. Wisconsin Area Source Fuel Use

AQCR	Coal (10^3 tons/yr)	Residual Oil (10^3 gals/yr)	Distillate Oil (10^3 gals/yr)	Natural Gas (10^6 ft^3/yr)
68[a]	23	890	38,340	8,890
73[a]	186	8,070	78,920	44,730
128[a]	215	22,630	244,460	87,050
129[a]	150	8,510	148,220	74,920
237	550	10,740	172,560	57,610
238	165	2,520	75,900	15,390
239	484	20,560	270,830	103,860
240	245	4,960	118,220	29,500
Total	2,018	78,880	1,147,450	421,950

[a]Interstate - Fuel use figure is for entire AQCR.

Preceding page blank

APPENDIX F

Fuels Assessment

Table F-1. Wisconsin Clean Fuels Analysis Summary

AQCR	Fuel	Existing Regulations Clean Fuel Requirements[a] < 1% S	1-2% S	> 2% S	Minimum Clean Fuels Savings Through Regulation Modification[b] < 1% S	1-2% S	> 2% S
68[c]	Coal			689			
	Oil	117			No modeling results available		
73[c]	Coal			457	No modeling results available		
	Oil	54					
128[c]	Coal		13	1,383			0
	Oil	1,433		1,374			
129[c]	Coal	6	3	399	No modeling results available		
	Oil	6,678	113				
237	Coal	432		2,756	No modeling results available		
	Oil	4,878	861				
238	Coal	55	153	865	No modeling results available		
	Oil	120	1,495	3,217			
239	Coal			4,491			0[d]
	Oil	25,998					
240	Coal	1,523	27	206	0		0
	Oil	1,037	240				
Wisconsin Total	Coal	2,016	196	11,246	0		0
	Oil	40,315	2,709	4,591			

[a] For power plants (Table C-1) and industrial/commercial/institutional point sources (Table D-1) only. Coal in 10^3 tons/yr; oil in 10^3 gal/yr. Wisconsin regulations do not specify a fuel % S limitation for existing, unmodified plants. The 1971 % S was used and reported as SIP. If 1971 data was unavailable, current % S was used.

[b] Based on modeling results for power plants only. State of Wisconsin regulations do not specify a coal percent sulfur limitation for existing plants; therefore, 1971 coal sulfur content was used and reported.

[c] Interstate

[d] Modeling calculations indicate that the 24-hour primary air quality standard may be exceeded even at SIP.

Preceding page blank

REFERENCES

1. Modeling Analysis of Power Plants for Compliance Extensions in 51 Air Quality Control Regions, report prepared under Contract No. 68-02-0049 for the U.S. Environmental Protection Agency, Walden Research Division of Abcor, Inc., Cambridge, Massachusetts, December 17, 1973.

2. Steam Electric Plant Factors, 1973, National Coal Association, Washington, D.C., January 1974.

3. Power plant data file, unpublished, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

4. Power plant SO_2 emission estimates, unpublished data, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

5. National Emissions Data Systems data bank, U.S. Environmental Protection Agency, Research Triangle Park, N.C.

6. Federal Energy Administration, unpublished data.